

From glowbugs@devp214.theporch.com Tue Feb 11 17:20:24 1997  
Return-Path: <glowbugs@devp214.theporch.com>  
Received: from devp214.theporch.com (devp214.theporch.com [192.150.244.22])  
by uro.theporch.com (8.8.5/AUX-3.1.1)  
with ESMTP id RAA27251 for <shimshon@theporch.com>;  
Tue, 11 Feb 1997 17:20:21 -0600 (CST)  
From: glowbugs@devp214.theporch.com  
Received: from devp214.theporch.com (localhost [127.0.0.1])  
by devp214.theporch.com (8.8.4/SCO-5.0.2) with SMTP  
id XAA02500; Tue, 11 Feb 1997 23:09:41 GMT  
Date: Tue, 11 Feb 1997 23:09:41 GMT  
Message-Id: <199702112309.XAA02500@devp214.theporch.com>  
Errors-To: ws4s@infoave.net  
Reply-To: glowbugs@devp214.theporch.com  
Originator: glowbugs@devp214.theporch.com  
Sender: glowbugs@devp214.theporch.com  
Precedence: bulk  
To: Multiple recipients of list <glowbugs@devp214.theporch.com>  
Subject: GLOWBUGS digest 443  
X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas  
X-Comment: Please send list server requests to listproc@theporch.com  
Status: 0

#### GLOWBUGS Digest 443

Topics covered in this issue include:

- 1) Need info on sealed mil-spec relay  
by rdkeys@csemail.cropsci.ncsu.edu
- 2) WTB SCOPE  
by leeboo@ct.net (Leon Wiltsey)
- 3) Technical Books FS  
by Chris Trask <ctrask@primenet.com>
- 4) Re: synchronous AM detection using tubes <repost>  
by Chris Trask <ctrask@primenet.com>
- 5)  
by jfurman@hal.cisco.com (Jeffrey Furman)
- 6) Re: Heterodyne Receiver  
by Chris Trask <ctrask@primenet.com>
- 7) Synchronous detectors and double sidebands  
by "James H. Haynes" <haynes@cats.ucsc.edu>
- 8) ArcusFivus BA/GB Net Fun and CHEAP antenna relays that work!  
by rdkeys@csemail.cropsci.ncsu.edu
- 9) VFO Voltage Regulators)5/ETV(r1\%/TLrrl7V  
by toyboat@freenet.edmonton.ab.ca
- 10) Coffee Can VFO - Voltage Regulators  
by toyboat@freenet.edmonton.ab.ca

-----  
Date: Mon, 10 Feb 1997 17:00:30 -0500 (EST)  
From: rdkeys@csemail.cropsci.ncsu.edu  
To: glowbugs@theporch.com  
Cc: rdkeys@csemail.cropsci.ncsu.edu ()  
Subject: Need info on sealed mil-spec relay  
Message-ID: <9702102200.AA149549@csemail.cropsci.ncsu.edu>

I found an old sealed mil-spec octal can relay by Sigma with the  
part numbers:

93417  
154-1451

on it. It looks like it might make a good keying relay for a glowbug.

Anyone have any idea what the voltage of it is or if it is a high-speed  
relay? It is SPDT with glass seals in a soldered up can on an octal  
base. It is not the usual plastic square can relay type of thing.

TNX/73/ZUT DE NA4G/Bob UP

-----  
Date: Mon, 10 Feb 1997 15:16:59 -0500 (EST)  
From: leeboo@ct.net (Leon Wiltsey)  
To: GLOWBUGS@theporch.com  
Subject: WTB SCOPE  
Message-ID: <199702102016.PAA16411@blue.ct.net>

LOOKING FOR ANY OLD OSCILLOSCOPE.  
NOTHING FANCY JUST CHEAP.  
AM RETIRED SEMIDISABLED SENIOR.

Thank the good LORD for all that you have!!!

Leon B Wiltsey jr. (Lee)

67yr old semi disabled senior  
(stroke got my balance)  
play keyboard and sing  
music 1920's to 60'  
none of the 90's noise

-----  
Date: Mon, 10 Feb 1997 17:59:39 -0700 (MST)  
From: Chris Trask <ctrask@primenet.com>  
To: Multiple recipients of list <glowbugs@devp214.theporch.com>  
Subject: Technical Books FS  
Message-ID: <Pine.BSI.3.95.970210175529.1900A-1000000@usr03.primenet.com>

At the risk of possibly being inappropriate for this maillist, I am presenting a list of books that I have for sale. These are available as a result of a recent book sale in Phoenix, and are extras after having culled out those that I already have, either as duplications or having been replaced with copies in better condition.

-----

I have the following electronic and math books for sale:

1. -----, "RCA TUNNEL DIODES FOR SWITCHING AND MICROWAVE APPLICATIONS," Radio Corporation of America, 1963  
pbk, VG  
\$7.50
2. -----, "SINGLE SIDEBAND FOR THE RADIO AMATEUR," 4th edition, ARRL, 1965, pbk, G/G+.  
\$7.50
3. -----, "THE ARRL ANTENNA BOOK," 12th edition, ARRL, 1970, pbk, G  
\$7.50
4. -----, "TRANSISTOR MANUAL," 7th edition, General Electric, 1964, pbk, F+/G- slightly worn on edges.  
\$10.00
5. Bronwell, Arthur B. and Robert E. Beam, "THEORY AND APPLICATION OF MICROWAVES," McGraw-Hill, 1947, hbk, G with very slight wear on edges.  
\$12.50
6. Chaffee, E. Leon, "THEORY OF THERMIONIC VACUUM TUBES," McGraw-Hill, 1933, hbk, EXCELLENT condition with little wear and no markings. One of the first comprehensive works on vacuum tubes.  
\$40.00

7. Jasik, Henry (ed), "ANTENNA ENGINEERING HANDBOOK," 1st edition, McGraw-Hill, 1961, hbk, no DJ. EXCELLENT condition with little wear and no markings. A classic text on antennas.  
\$30.00
8. Landee, R.W., D.C. Davis, and A.P. Albrecht, "ELECTRONIC DESIGNER'S HANDBOOK," McGraw-Hill, 1957, hbk, G+. This reference is full of vacuum tube circuitry as it existed at the end of the era.  
\$20.00
9. Langford-Smith, F. (ed), "RADIOTRON DESIGNER'S HANDBOOK," 4th edition, Radio Corporation of America, 1952, hbk. Considerable wear. Covers worn through on three sides, rear cover hinge worn through 75%, owner's name inscribed inside front cover. All pages are intact with no markings. This is the classic, big, red book and is in fully restorable condition. A collector's bargain.  
\$50.00
10. Lindsey, William C. and Marvin K. Simon, "TELECOMMUNICATION SYSTEMS ENGINEERING," Prentice-Hall, 1973, hbk, G- with wear on spine and cover edges. Good reference for modulation and demodulation techniques.  
\$12.50
10. Marcuvitz, N. (ed), "WAVEGUIDE HANDBOOK," Dover, 1965, G/G+. This is a Dover paperback reprint of the MIT Radiation Lab Series vol. #10.  
\$12.50
11. Milne-Thompson, L.M., "JACOBIAN ELLIPTIC FUNCTION TABLES," Dover, 1950, pbk, G  
\$7.50
12. Terman, Frederick E., "ELECTRONIC AND RADIO ENGINEERING," 4th edition, McGraw-Hill, 1966, hbk, G. This is a Mei Ya Taiwan photo-offset reproduction, well-made with good paper and binding. Still the same excellent reference as originally printed by McGraw-Hill.  
\$20.00
13. Van Valkenburg, M.E., "NETWORK ANALYSIS," Prentice-Hall, 1955, hbk, G- with wear on edges and discolouration on front cover.

\$15.00

14. Van Valkenburg, M.E., "NETWORK ANALYSIS," Prentice-Hall, 1955, hbk, G- with wear on edges and students notes inside both covers.  
\$15.00
15. Walston, Joseph A. and John R. Miller, "TRANSISTOR CIRCUIT DESIGN," McGraw-Hill/Texas Instruments, 1963, hbk, G/G+ with owner's inscription inside front cover.  
\$15.00
16. Walston, Joseph A. and John R. Miller, "TRANSISTOR CIRCUIT DESIGN," McGraw-Hill/Texas Instruments, 1963, hbk, G/G+ with marks inside front cover and small stain on front cover.  
\$15.00

Prices are exclusive of shipping costs. Add \$3.50 for first book, and \$1.50 for each additional. Payment in advance by cheque or money order.

I gotta go.

Regards,

Chris

```

      ,-----'
    /   If you understand it, \
   /     then it's obsolete!   \
  \-----'
 | /
oo\
(--) \
  \   \   . ' .
   \   \   \   \
    \   \   "   \
     \   \       \
      .   ( )   \
        '-| ) _- :. \
          | | | | \ '.
           c__; c__; ' -.. '>. __

```

## Circuit Design for the RF Impaired

Chris Trask / N7ZWY  
Principal Engineer  
ATG Design Services  
P.O. Box 25240  
Tempe, Arizona 85285-5240

Email: [ctrask@primenet.com](mailto:ctrask@primenet.com)

Graphics by Loek Frederiks

-----  
Date: Mon, 10 Feb 1997 19:50:56 -0700 (MST)  
From: Chris Trask <ctrask@primenet.com>  
To: Dan Kerl <dlkerl@ro.com>  
Subject: Re: synchronous AM detection using tubes <repost>  
Message-ID: <Pine.BSI.3.95.970210192553.9813A-1000000@usr07.primenet.com>

Please excuse the somewhat lengthy reply.

On Mon, 10 Feb 1997, Dan Kerl wrote:

> Since I enjoy listening to short-wave programming on tube  
> receivers, I'm contemplating the details of a project to build  
> a synchronous AM add-on detector using no semiconductors.  
> While information on some of the details hasn't been too  
> difficult to find (variable reactance-tuned oscillator for a  
> VCO, etc.), I have trouble visualizing how to make a decent  
> phase detector. I would also like to incorporate adaptive  
> loop filtering, with wide bandwidth out-of-lock and narrow  
> bandwidth in-lock. I intend to use one of those 6JH8  
> sheet-beam tubes that AES has on sale as the detector.  
>  
> Are there any commercial examples of tube-based AM synchronous  
> detectors that I can use for ideas? How does a tube color TV  
> phase-lock its colorburst oscillator with the back-porch  
> reference burst and could this technique be adapted? Mapping  
> modern semiconductor equivalents of common PLL functions onto  
> a tube environment can get out of hand.  
>

Oh Boy! A really ambitious tube project.

I would use the sheet-beam modulator for the demodulator, but not for the phase detector, for two reasons: First, the phase detector does not have to be that good in terms of linearity, and second, it can be done cheaper with three triodes. A 6AR8 is an alternative to the 6JH8.

Borrowing from solid-state practices, I would first pass the incoming AM signal through a balanced phase splitter and then at least one stage of limiting (balanced), with both (or more) stages employing common-node feedback to reduce the amount of even-ordered harmonics and produce a "reasonable" square wave to the phase detector. These stages can all be resistively coupled, providing that adequate bandpass

filtering has been done earlier.

The VCO should also be passed through a limiting stage. This will ensure that the phase detector has a constant phase gain (volts per radian) which is necessary to ensure loop stability.

The phase detector is comprised of three triodes. Two are connected as a long-tailed pair (cathodes together), with the balanced differential signal(s) from the splitter/limited resistively coupled to the grids. The conditioned VCO signal is connected to the third, or source, triode, whose plate is connected to the cathodes of the other two triodes. Note that the upper two triodes will have their grids connected to a positive potential. They can conceivably be directly connected to the plates of the last limiter stage. There were some triple triode envelopes produced at the end of the tube era, and they had 12 pins. If not available, a 12AU7 (or whatever) can be used for the phase detector, and another triode pair used to buffer the VCO to both the phase detector and the demodulator.

This phase detector is of the quadrature variety, so a 90-degree phase shift will be required from the VCO to the sheet-beam demodulator, so as to get maximum conversion gain. This can easily be done with a pair of RC networks, each providing 45-degrees in opposite polarities.

I have used a similar approach to make inexpensive ISM AM receivers using an FM IF integrated circuit. I use the limiter stages to recover the carrier by way of limiting, and then leave out the discriminator coil and feed the linear signal before the limiter to the quadrature detector input. This can only be done with the Philips NE604 and NE605 (plus their SE equivalents) devices, neither of which have the usual internal coupling capacitor from the limiter output to the quadrature input.

It was nice of them to leave it out, as there are presently no "convenient" single- or non-conversion AM IC's readily available.

Gee, I love this stuff.

I gotta go.

Regards,

Chris

```

/ ----- \
/ If you understand it, \
/ then it's obsolete!   \
\ ----- '

```

Circuit Design for the  
RF Impaired

Chris Trask / N7ZWY  
Principal Engineer  
ATG Design Services  
P.O. Box 25240  
Tempe, Arizona 85285-5240

Graphics by Loek Frederiks

I just dug up an old copy of an article: "A Heterodyne Receiver"  
January, 1966 Electronics World.  
tube lineup:  
12ax7 balanced mixer  
12ax7 oscillator and phase splitter  
12ax7 peaking audio amp  
12ax7 select-o-ject feedback  
6eb8 driver, output.  
"Sensitivity of the product detector is enhanced by regeneration..."  
Since the mixer looks a lot like a hartley oscillator, I wonder if it's  
a regenerator too?  
Strange ckt.  
73, Jeff KD6MNP jfurman@ocsinc.sbay.org

On Tue, 11 Feb 1997, Jeffrey Furman wrote:



```
> I just dug up an old copy of an article: "A Heterodyne Receiver"
> January, 1966 Electronics World.
```

<\*\*\* El Snipperino \*\*\*>

```
> "Sensitivity of the product detector is enhanced by regeneration..."
> Since the mixer looks a lot like a hartley oscillator, I wonder if it's
> a regenerator too?
>
> 73, Jeff KD6MNP  jfurman@ocsinc.sbay.org
```

Yes, it's actually a regenerative amplifier. The 12AX7A mixer is biased to a point below which it would become an oscillator with the tap on the antenna coil L1. The local oscillator uses the exact same tank inductor, but the bias point is higher, increasing the transconductance.

This is really a very clever circuit, and the author (WB6NTR) has used two forms of regeneration (positive feedback) to enhance the selectivity and sensitivity.

I used a regenerative amplifier stage in an active antenna recently, using a 12AU7 as a balanced cathode follower after the antenna and a pair of 6AN8's as a balanced mixer (pentode sections), VCO (one of the triodes) and Q-Multiplier (other triode), or regenerator. I observed the effective Q of the system go from 100 with the regeneration at minimum to 1500 with it cracked just below oscillation. The linearity was great. The trick is to design the things such that they won't oscillate.

I've seen a solution from 1936 with tubes and 1962 with transistors.

I gotta go.

Regards,

Chris

## Circuit Design for the RF Impaired

Chris Trask / N7ZWY  
Principal Engineer  
ATG Design Services  
P.O. Box 25240  
Tempe, Arizona 85285-5240

```

      ( ) \
    '-| )__| :. \
      | | | | \ '.
      c__; c__; '-...'>.__

```

Email: ctrask@primenet.com

Graphics by Loek Frederiks

-----  
 Date: Mon, 10 Feb 1997 22:13:06 -0800  
 From: "James H. Haynes" <haynes@cats.ucsc.edu>  
 To: glowbugs@devp214.theporch.com  
 Subject: Synchronous detectors and double sidebands  
 Message-ID: <199702110613.WAA17827@hobbes.UCSC.EDU>

The talk about synchronous detectors reminded me that back in the late 50s when the military was going whole hog for SSB there was a paper by John Costas of G.E. suggesting maybe that wasn't the wisest thing to do. He argued for double sideband suppressed carrier, saying that suppressing the carrier gets you the power advantage that SSB has; and by transmitting both sidebands you trade bandwidth for SNR (in some sense it's a very slightly spread spectrum). He described a receiver that used a synchronous detector - I don't remember now if it was a superhet or a direct-conversion model.

If I understand the argument correctly it's something like this. In the case of white noise if you double the receiver bandwidth (from SSB bandwidth to DSB bandwidth) you double the noise power. But because the two sidebands are coherent they add in the detector; you double the signal voltage, hence quadruple the power.

Seems like there was a little while when hams were generating DSB suppressed carrier just because it was easy and didn't require any sharp filtering the way SSB does; but they were receiving it with conventional SSB receivers, so one of the sidebands was going to waste (and QRM).

Does anybody mess with this stuff anymore?

-----  
 Date: Tue, 11 Feb 1997 11:30:19 -0500 (EST)  
 From: rdkeys@csemail.cropsci.ncsu.edu  
 To: glowbugs@theporch.com, boatanchors@theporch.com  
 Cc: rdkeys@csemail.cropsci.ncsu.edu ()  
 Subject: ArcusFivus BA/GB Net Fun and CHEAP antenna relays that work!  
 Message-ID: <9702111630.AA150205@csemail.cropsci.ncsu.edu>

I had the good fortune to get the ol' ArcusFivus barnburner up at a fine etherburning tilt of 12 wattes de ethere, and had great fun for about 4 hours on the BA/GB 80M QRG. Folks all over east of the Big Muddy heard it and it seemed to be quite stable and chirp free, stock (i.e., using the underbelly selector relay for keying and disconnecting one lead to the antenna relay and rolling the contact around to make the antenna contact --- all else unmodified). I was able to do some serious QRQ/QSK research with it and have the following findings for the group:

- 1) The generic underchassis selector keying relay will key fine at any QRQ up to 35wpm, without spitting dits by the use of a 5ufd capacitor across the keying contacts (i.e., across the relay coil) to nudge the relay slightly. Keying was essentially perfect, with no chirp or clicks, provided the oscillator B+ was made first before the amplifier cathodes were keyed (bend slightly the oscillator contact on the underchassis selector relay to make ahead of the final amplifier cathode contact).
- 2) A very simple and effective ``semi-breakin'' antenna changeover relay can be made using a standard industrial strength 10 hp contactor relay (the big spdt plastic monsters about 3 inches cubed) of the 24 vdc or 110vac types (I used a Potter and Brumfield plastic cubed plugin relay about 3 inches cubed number PRC5A11 120vac 50/60 hz). A series polarity diode to the key and a 1000 ufd 50v cap across the contactor relay coil gave about a 3 second changeover delay.
- 3) On separate antennas, the ol' arcusfivus would QSK with the best of the bigboyz and their hills o' Tennessee technical boxen. On a single antenna with that UGLY of UGLIES looking contactor, it would semi-qsk with the best of the other style boxen wat can only muster up a slow sort-of-vox-based ``semi-breakin'' QSK.

My guess is that any of the usual plastic industrial contactor relays would work fine as antenna changeover relays for generic glowbugging and boatanchoring use, at any power up to about 100 wattes de ether. My use of it was in a HIGH IMPEDANCE antenna at 12 watts with no ill effects. On a 50 ohm line or a 600 ohm line, it would be a no sweat. They are way to slow to do true QSK, even at 15 wpm, but perfectly fine in semi-breakin mode. Apparently, the bigger and the uglier, the better, when it comes to sufficient plastic insulation to render the relays acceptable for rf use. The contacts were a good 1/4 or 5/16 inch in size and should easily handle the rf load.

All right! For the rest of the week/weekend, I challenges all ye fine Glowebugeites and Boatanchorites to fires ye up yer ArcusFivies rigges an' rattles an' bangs with the best of the ancient ether burners! Fer those of ye without such accoutrements de hamdom as antenna

changeover relays (i.e., the quick fingerdriven alligatorclippe crowd),  
grapples ye up any fine industrial strength junque box contactor relay  
fer antenna a'changin' an' tally ho!

73/ZUT DE NA4G/Bob UP

-----  
Date: Tue, 11 Feb 1997 11:11:20 -0700 (MST)  
From: toyboat@freenet.edmonton.ab.ca  
To: glowbugs@devp214.theporch.com  
Subject: VFO Voltage Regulators)5/ETV(r1\%/TLrrl7V  
Message-ID: <Pine.A41.3.95.970211105602.115000A-100000@fn2.freenet.edmonton.ab.ca>

f:5sz Hello,

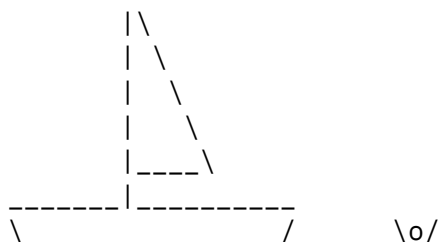
I ran across a neat little glowbug VFO for a future use. (Coffee Can  
VFO, QST of August 1949)

It is very appealing because of its simplicity. It uses two 6V6's  
with one triode-connected as oscillator and the other as an untuned  
buffer stage. The coil is untapped, so simple to make. The 75pF  
tuning cap is padded with a 100pF fixed cap and needs no vernier.  
Parts are few and performance is rated as very good. The author  
built each stage in a coffee can and attached them to a wooden  
box power supply enclosure, hence the name.

It needs 150VDC @ 75mA, regulated. The author used a VR-150 tube and a  
uxAUeoeu  
uFp6300VDC

My limited knowledge of

indicates that they usually max out at 50VDC.



~~~~~  
Shane <toyboat@freenet.edmonton.ab.ca>  
~~~~~

-----  
Date: Tue, 11 Feb 1997 11:42:41 -0700 (MST)  
From: toyboat@freenet.edmonton.ab.ca  
To: glowbugs@devp214.theporch.com  
Subject: Coffee Can VFO - Voltage Regulators  
Message-ID: <Pine.A41.3.95.970211111945.14180D-1000000@fn2.freenet.edmonton.ab.ca>

Hello Again,

Sorry for the previous scrambled message. It got away somehow even though my ISP connection was interrupted before I finished it.

As I was saying, I was in need of a solid-state VR supply, for 150VDC @ 75mA. 125VDC or so, up to 160VDC or so would also work, as long as it is regulated at some point. I prefer not to use a VR tube, to keep the unit compact and simple. I was planning to use a 6AQ5 to sub for the 6V6 (7 pin equiv.) and a 6C4 or some other 7 pin triode for the oscillator. (or maybe just another 6AQ5)

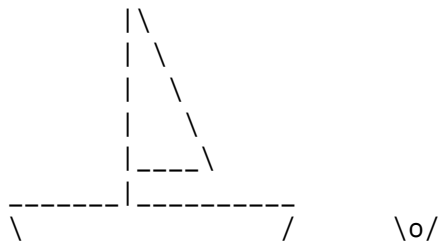
My limited knowledge of solid state VR's is that most of them max out at 50VDC. Is there a cheap and easy solution for my supply? I was thinking of using Radio Shack filament trafos back-to-back as the

power trafo and filament supply.

Seems like a suitably simple and obtainable-parts type project, if the regulator solution can be figured out.

Thanks for the help, everyone.

Regards,  
Shane Wilcox



~~~~~  
Shane <toyboat@freenet.edmonton.ab.ca>  
~~~~~

-----  
End of GLOWBUGS Digest 443  
\*\*\*\*\*